



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/678,301

10/06/2003

Hiroo Takizawa

Q77851

4148

65565 7590 12/22/2006  
SUGHRUE-265550  
2100 PENNSYLVANIA AVE. NW  
WASHINGTON, DC 20037-3213

EXAMINER

ANGEBRANNDT, MARTIN J

ART UNIT

PAPER NUMBER

1756

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

12/22/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/678,301

**Applicant(s)**

TAKIZAWA ET AL.

**Examiner**

Martin J. Angebrannt

**Art Unit**

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10/13/06 & 11/9/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1756

1. The response of the applicant has been read and given careful consideration. The proper terminal disclaimers are sufficient to obviate the double patenting rejections. The amendment to the claims obviates the previous rejections.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farid et al. '529, in view of Harada et al. '032 and Swainson et al. '861

Farid et al. '529 forms a composition comprising dye PS-31 (col 23-24), a binder, monomer and inhibitor and an activator, exposed to light and the number of steps hardened determined. (see also 16/27-18/19). The dye PS-31 has a absorption maximum of 453 nm. Other sensitizers used include the cyanine dyes of table 1 (PS-1 through PS-12), styryl dyes PS-13 through PS-20 and xanthene dyes PS-32 to PS-33. The use of various substrates including aluminum and lithographic paper is disclosed. (14/17-36). The use of oxonol dyes is disclosed merocyanine, hemioxonol, cyanine , hemicyanine and styryl dyes. (4/27-44)

Harada et al. '032 teach the curing of photopolymerizable compositions using two photon processes. The light is an ultrashort pulses from a Ti:Sapphire. [0013]. The two photons absorbed add up to the energy of a photon of half their wavelength and curing takes place only where the focus occurs resulting in high resolution capability and fewer problems. [0016-0019].

Art Unit: 1756

The Ti:Sapphire emits a pulse of 100-300 fs pulse at a wavelength within the 700-900 nm range.

[0044-0045].

Swainson et al. '861 establish that the use of two photon processes is old and well known in the imaging arts. In the embodiments of Class I, Group 2, a two photons of the same wavelength are used to cause the photoreaction. The energy difference between the two states being greater than the energy of a single photon, but equal or less than twice the energy of the photon. The starting point is a material with known one photon photoresponsive properties. Example 3 is a photopolymerization system including xanthene dye sensitizer eosin Y. (5/30-6/35). The two photon sensitivity of cyanine dyes is disclosed. (12/48-51).

It would have been obvious to one skilled in the art to modify the process of Farid et al. '529 in the examples using dye PS-31 by using a two photon exposure process with a Ti:Sapphire laser tuned to a wavelength of 900 nm which is near the two photon absorption of maxima of ~ 906 nm as taught by Harada et al. '032 to increase the resolution of the imaging process as discussed by Harada et al. '032 with a reasonable expectation of exciting the two photon polymerization based upon the teachings of Swainson et al. '861 showing this for cyanine and xanthene dyes and establishing that a good starting point is a compound having a single photon response, which is established for the oxonol dye PS-31 by Farid et al. '529.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farid et al. '529, in view of Harada et al. '032 and Swainson et al. '861, further in view of Penzkofer et al., "S<sub>0</sub> and S<sub>1</sub> two photon absorption dynamics of organic dyes solutions", Opt. Quantum electron. Vol. 19 pp. 327-349 (1987)

Penzkofer et al., "S<sub>0</sub> and S<sub>1</sub> two photon absorption dynamics of organic dyes solutions", Opt. Quantum electron. Vol. 19 pp. 327-349 (1987) teaches the two photon absorption of trimethine dye HMICI and PYC, with PYC bearing ketone containing terminal moieties similar to those of an oxanol dye.

In addition to the basis provided above, the examiner cites Penzkofer et al., "S<sub>0</sub> and S<sub>1</sub> two photon absorption dynamics of organic dyes solutions", Opt. Quantum electron. Vol. 19 pp. 327-349 (1987) to further support the position that the oxanol dye PS-31 will have an appreciable two photon absorption cross section, sufficient to cause two photon polymerization, further supporting the obviousness of the combination of Farid et al. '529, in view of Harada et al. '032 and Swainson et al. '861 set forth above.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tsien et al. '379 teaches the single photon absorption of a trimethine oxanol dye as being 542 nm (16/1-17), so the two photon absorption would be at 1084 nm. The use of two photon processes is disclosed. (2/50)

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37


Art Unit: 1756

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Martin J. Angebrannndt  
Primary Examiner  
Art Unit 1756

12/19/2006